

FORM PTO-1390 (Modified)
(REV 11-98)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

71113-0006

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/786856

INTERNATIONAL APPLICATION NO.

PCT/NZ99/00156

INTERNATIONAL FILING DATE

16 September 1999

PRIORITY DATE CLAIMED

16 September 1999

TITLE OF INVENTION

Method and Apparatus for Editing a Program

APPLICANT(S) FOR DO/EO/US

Roger BENT

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ Certificate of Mailing by Express Mail
20. ☐ Other items or information:

Amendment made during International Preliminary Examination

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/786856

INTERNATIONAL APPLICATION NO.
PCT/NZ99/00156ATTORNEY'S DOCKET NUMBER
71113-0006

21. The following fees are submitted:

CALCULATIONS PTO USE ONLY

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

- ☒ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **\$1,000.00**
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **\$860.00**
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **\$710.00**
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) **\$690.00**
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) **\$100.00**

ENTER APPROPRIATE BASIC FEE AMOUNT =**\$1,000.00**Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).**\$0.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	20 - 20 =	0	x \$18.00
Independent claims	2 - 3 =	0	x \$80.00

\$0.00**\$0.00**Multiple Dependent Claims (check if applicable). ☐**\$0.00****TOTAL OF ABOVE CALCULATIONS =****\$1,000.00**Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). ☒**\$500.00****SUBTOTAL =****\$500.00**Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).**\$0.00****TOTAL NATIONAL FEE =****\$500.00**Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☐**\$0.00****TOTAL FEES ENCLOSED =****\$500.00**

Amount to be:

refunded

\$

charged

\$

☒ A check in the amount of **\$500.00** to cover the above fees is enclosed.


☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **04-1061** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Song Zhu
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SIGNATURE

Song Zhu

NAME

44,420

REGISTRATION NUMBER

12 March 2001

DATE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
)
Roger BENT) Art Unit: _____
)
National Phase Application of)
International Application No. PCT/NZ99/00156) Examiner: _____
)
International Filing Date: September 16, 1999)
)
For: METHOD AND APPARATUS FOR)
EDITING A PROGRAM)

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicant requests that the referenced application be amended as shown below.

IN THE CLAIMS:

Please amend the claims as follows:

4. (Amended) A method according to claim 1 wherein the control codes are generated at a remote control code facility and the edited program sequence is generated at a local station, the method further comprising transmitting the control codes from the control code facility to the local station.
7. (Amended) A method according to claim 1 further comprising storing an edited program comprising a plurality of program segments which run in the edited program sequence.
8. (Amended) A method according to claim 1 further comprising displaying an edited program comprising a plurality of program segments which run in the edited program sequence.
9. (Amended) A method according to claim 1 further comprising storing edited program sequence data which is indicative of the desired program segments which make up the edited program sequence.
10. (Amended) A method according to claim 9 wherein the edited program sequence data comprises a list of program time markers.

11. (Amended) Apparatus for editing a program, the program comprising a plurality of adjacent program segments which run in a program sequence and a plurality of program time markers each associated with a respective program segment, the program including at least one undesired program segment interleaved between a pair of non-adjacent desired program segments, the apparatus comprising:

means for generating a plurality of control codes, each control code being indicative of program content contained in a respective program segment;

means for generating a control code time marker for each control code;

means for identifying the undesired program segment(s) by comparing the control codes with previously stored personal preference data to identify an undesired control code, and locating a program segment having a program time marker corresponding with the control code time marker of the undesired control code; and

means for generating an edited program sequence by skipping the identified undesired program segment(s) and arranging the pair of desired program segments such that they lie adjacently in the edited program sequence.

14. (Amended) Apparatus according to claim 11 wherein the control codes are generated at a remote control code facility and the edited program sequence is generated at a local station, the apparatus further comprising means for transmitting the control codes from the control code facility to the local station.

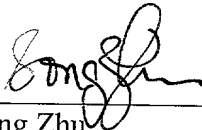
17. (Amended) Apparatus according to claim 11 further comprising a memory for storing an edited program comprising a plurality of program segments which run in the edited program sequence.

18. (Amended) Apparatus according to claim 11 further comprising a display for displaying an edited program comprising a plurality of program segments which run in the edited program sequence.

19. (Amended) Apparatus according claim 11 further comprising a memory for storing edited program sequence data which is indicative of the desired program segments which make up the edited program sequence.

Respectfully submitted,

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Docket No. 71113-0006
Date: March 12, 2000

DC 99999-200 68015

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The following claims have been amended as follows:

Claim 4, line 1, please change "any one of the preceding claims" to --claim 1--.

Claim 7, line 1, please change "any one of the preceding claims" to --claim 1--.

Claim 8, line 1, please change "any one of the preceding claims" to --claim 1--.

Claim 9, line 1, please change "any one of the preceding claims" to --claim 1--.

Claim 10, line 1, please delete "and claim 3".

Claim 11, line 6, please change "method" to --apparatus--.

Claim 14, line 1, please change "any one of the claims 11 to 13" to --claim 11--.

Claim 17, line 1, please change "any one of claims 11 to 16" to --claim 11--.

Claim 18, line 1, please change "any one of claims 11 to 17" to --claim 11--.

Claim 19, line 1, please change "any one of claims 11 to 18" to --claim 11--.

METHOD AND APPARATUS FOR EDITING A BROADCAST PROGRAMTHE TECHNICAL FIELD

5 The present invention relates to a method and apparatus for editing a program.

BACKGROUND OF THE INVENTION

10 A large section of society considers many TV programs to be superfluous, or harmful or offensive to them or their children. Whilst program producers and TV stations enjoy significant freedom in the content and mix of their product and how it is distributed, viewers' only available protection is the choice to either turn it off or watch it. The wide range of available
15 programs with their differing standards makes this form of protection unacceptable, especially where children's viewing is involved. Single parent families, or families where both parents work has led to the situation where children's television viewing is unsupervised during long periods of the day. The type of programs watched and the extended
20 viewing periods are of great concern to many parents. It is a belief of many parents that television viewing shapes their children's values and influences their behavior, and unfortunately many parents feel TV's influences are not always beneficial. This premise generated the first incentive to develop this invention.

25 A significant growth in television commercialism leaves many viewers feeling they are identified and manipulated as consumers rather a group needing entertainment. Advertising break frequency and duration determine program segment length as much as they are by entertainment
30 value. Programs are edited (cut) to incorporate the "set" amount of advertising. The duration of advertising can be varied by programmers to increase as the program associated with the advertising progresses. It will come as no surprise that advertising increases towards the end of a major

feature film. In many countries, this has reached the stage where a common cry is for a reduction in advertising with a corresponding increase in television fees. This solution would be unacceptable to many advertisers; consequently, programmers have ignored this as a possible solution to counteract falling viewing figures identified since the early 1990's. The reduction in viewing pleasure resulting from increased advertising generated the second incentive to develop this invention.

Every working household has less free time today than in the seventies and eighties, the promise of increased leisure time, as promised in the sixties and seventies as a result of automation never eventuated. Automation arrived, productivity increased significantly, but the promised rewards for most of society remain unsatisfied. This reduction in available time has elevated leisure time to a higher level resource, a resource worth valuing. Viewing time for many is an essential part of relaxation in the hectic life we now lead. An individual has personal preferences for the types of material they wish to view on television. Relaxation time watching programs should have something for everyone. The impossibility of this desire with present day TV generated the third incentive to develop this invention.

The ability to filter out either objectionable or unwanted material from TV broadcasts has been the subject of many developments and inventions. Many have been concerned with the removal of objectionable information to protect children. One such system is described in WO-A-97/23996 in which undesired program segments are removed and replaced with substitute program segments.

It is an object of the present invention to provide a reliable, convenient and practical method and apparatus for controlling program material based on content and to enable automatic tailoring to fit individual preferences.

DISCLOSURE OF THE INVENTION

In accordance with a first aspect of the present invention there is provided a method of editing a program, the program comprising a plurality of adjacent program segments which run in a program sequence and a plurality of program time markers each associated with a respective program segment, the program including at least one undesired program segment interleaved between a pair of non-adjacent desired program segments, the method comprising:

generating a plurality of control codes, each control code being indicative of program content contained in a respective program segment; generating a control code time marker for each control code; identifying the undesired program segment(s) by comparing the control codes with previously stored personal preference data to identify an undesired control code, and locating a program segment having a program time marker corresponding with the control code time marker of the undesired control code; and generating an edited program sequence by skipping the identified undesired program segment(s) and arranging the pair of desired program segments such that they lie adjacently in the edited program sequence.

The present invention provides a method and apparatus for automatically tailoring programs to individual preferences, including editing undesired content such as political reporting, medical operations, violence, nudity, sex, obscene language and advertisements from a program, such as a television or radio broadcast.

Programs may be categorised as suitable for specific age ranges or for individuals with certain psychological traits that are easily disturbed by certain program material, although a viewer can modify these. The categories involved cover a multitude of subject matter, only a few of the possible fields are covered here. The rapid growth of the communications industry will involve the greater availability of potentially harmful and/or

offensive material, necessitating a uniform system of control for both standards and best use of available viewing time.

5 The program may be made up of video data, audio data, or a combination of the two. The program may be broadcast at a scheduled start time on a mass broadcast medium (eg. a conventional TV transmitter, cable or satellite network) to a plurality of viewers. Alternatively the program may be transmitted to a single viewer as part of a "video on demand" system, or over the internet. Alternatively the program may be provided on a
10 recording medium (eg. a DVD) which is physically delivered to the viewer.

Typically the desired and undesired program segment(s) are stored, and the edited program sequence is compiled from the stored program segment(s). This is particularly advantageous for a mass broadcast TV
15 program with inserted advertisements (which the TV station does not want removed). The entire program is stored during the scheduled broadcast, giving time for the control codes to be generated (identifying the inserted advertisements). At a later time the edited program sequence is compiled from the recorded program. In this case, the program is
20 preferably stored with program time markers which are compared with control code time markers to identify undesired program segments.

Alternatively the edited program sequence may be generated "on the fly" without storing the undesired program segments. For example, the
25 program may be provided to the viewer with embedded time codes (either inserted into a program being transmitted to the user, or stored on a DVD along with the program data). The viewer's system then selects only desired program segments for viewing or recording.

30 The control codes may be provided with the program on a previously recorded DVD. Alternatively the control codes are generated at a remote control code facility and the edited program sequence is generated at a

local station, the method further comprising transmitting the control codes from the control code facility to the local station.

5 After the edited program sequence has been generated, the sequence (eg: a list of program time markers) may be stored. An edited program (ie. a plurality of program segments which run in the edited program sequence) can then be stored for later viewing, or viewed immediately.

10 According to a second aspect of the present invention there is provided apparatus for editing a program, the program comprising a plurality of adjacent program segments which run in a program sequence and a plurality of program time markers each associated with a respective program segment, the program including at least one undesired program segment interleaved between a pair of non-adjacent desired program segments, the apparatus comprising:

15 means for generating a plurality of control codes, each control code being indicative of program content contained in a respective program segment;

20 means for generating a control code time marker for each control code;

25 means for identifying the undesired program segment(s) by comparing the control codes with previously stored personal preference data to identify an undesired control code, segment having a program time marker corresponding with the control code time marker of the undesired control code; and

30 means for generating an edited program sequence by skipping the identified undesired program segment(s) and arranging the pair of desired program segments such that they lie adjacently in the edited program sequence.

For restricted adult content, the apparatus may require entering a security code, password or PIN number before viewing a program.

The control codes are preferably information on type of program on an ongoing basis, identifying content related to many different categories. The control codes may also identify country, or region of a country where program was broadcast, TV channel, or station, where program was broadcast and type of content along with other categories to identify material being recorded.

The system and method of the present invention may be built into a new system, integrated into an existing system, or provided by an external stand-alone unit.

The recording and playback means may be incorporated within a single unit or may be separate units enabling programs to be played while another program is simultaneously recorded or for multiple programs to be simultaneously played or recorded. This also allows the accommodation of multiple individual preferences. The recording media may be magnetic recording media such as disk drive, a writeable or re-writeable DVD or CD-ROM, RAM or other suitable random access storage media.

BRIEF DESCRIPTION OF DRAWINGS

An example of the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a diagram of the main system elements.

Figure 2 show a local station in detail.

Figure 3 shows a remote station in detail.

Figure 4 shows a code production facility in detail.

Figure 5 shoes a user validation system.

Figure 6 shows a machine check system.

Figure 7 is a process diagram showing the recording of a program signal into memory.

AMENDED SHEET
IPEA/AU

Figures 8A and 8B are a process diagram showing the playing of a program from memory.

Figure 9 is a process diagram showing a code download to a local station.

5 Figure 10 is a process diagram showing a method of manually recording a program into local memory.

Figure 11A is a schematic view of an unedited program, including undesired program segments.

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Figure 11B is a schematic view of an edited program with the undesired program segments removed.

Figure 12 is a process diagram showing the selection of recording quality level.

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DETAILED DESCRIPTION OF THE DRAWINGS

Figure 1 shows a typical system application where a local station 100, assumed to be an individual TV video recorder and play-back system whose recording and playback are controlled, using externally produced control codes transferred from control code storage 370 via a remote station 200. The remote station 200 is connected to a control code production facility 300 producing control codes that are periodically transmitted to the local station 100, an EPG information store 270 and a time facility 325.

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Each local station has a scheduled time to initiate a code request connection with the remote station to transfer control codes and other related information. A basic operational sequence, for a single user, from initial setup of a local machine through to viewing a recorded program, is shown below.

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Basic Operational Sequence

1. Install local station 100 and apply power
2. Personal preferences are established, by user, to determine what types of program are to be recorded and how these will be viewed. They will also establish what restrictions, if any, are to be applied on a variety of categories to control undesirable material within the recorded program. The personal preferences are stored in the memory 140. The stored personal preferences include a list of program types of interest to the user (eg. cookery, sport etc.), a set of maximum program ratings (eg. maximum violence rating, maximum sexual rating), and instructions to remove advertising, production credits etc.
3. Local station 100 contacts remote station 200 and transfers electronic program guide (EPG) information from store 270. The EPG information consists of a time table of future programs on the selected TV channels or stations, program stop and start times, program descriptions, program main characters, actors, etc. and a program type that identifies the subject of each program. If a particular program features cookery, it will have a program type identifying it as a cookery program. It will also have a general rating classification relating to the type of audience, this may be a restricted adult program a family program or one specifically made for children, or one of several other categories. During the connection between local station and remote station, the remote station also corrects any errors of local station time clock using time check facility 325.
4. Local station 100 processes this transmitted EPG information 270 and selects programs having subjects that achieve the closest match to chosen personal preferences. These selected programs

are stored as program selection information in local station memory 140 for later display as a menu on TV 156.

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5. TV 156 shows the menu of selected programs selected under step 4, and other programs that are the next closest match to the personal preferences. The menu selection is open to change by the user so that other programs can replace those automatically chosen. The selected recording quality, which ranges from low to high, and depends upon individual program graphic detail and movement is also shown on the screen menu, this is also changeable. A high visual quality increases the amount of required graphical information and reduces the length of time available for recording.
6. The programs selected in Step 5 are recorded by the local station at their start times. The program data is recorded with program time markers embedded every 1/100 of a second from an accurate local station time clock. The selected channel, or station involved is also identified along with stop and start time for program recording. Following each recording the selected program status on the screen menu is changed from selected to recorded. The program data with embedded time markers, channel, station and stop/start times are saved in local memory 140.
7. At the next scheduled automatic connection between local station 100 and remote station 200, control codes 370 are stored in memory 140 for those programs confirmed as recorded, using information stored in memory 140. During the connection the local station EPG information is also updated by the remote station 200 to maintain a set period of EPG information. Assume this set period is fourteen days, then each day the EPG information for one more day would be added and the EPG information regarding programs that have now been played removed from memory. EPG

information for recorded programs is retained until they are deleted.
At each connection between local station 100 and remote station
200 the local station time clock is aligned with remote station
clock.

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8. When a program to be played, is selected from TV 156 program
menu, if control codes have been stored for the selected program,
the local station 100 will locate the appropriate control codes 370
stored in local memory 140, using the previously memorised
channel or station involved along with their start and stop times.
These parameters locate the stored control codes 370 for the
selected program.

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9. The program is played.. The control codes 370 act as signposts for
events along the program's length. As each signpost is met it is
compared to the personal preferences. Many of the control code
370 signposts will cause no action from the local station during
playback since the personal preferences for that signpost, or
category, have not been enabled.

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Control code production

Control code production takes place at the remote code production facility
300. Control code transfer takes place between the remote control code
production facility 300 and each local station 100, via a phone network,
or some other means of information transfer. The application of the
control codes occurs in each local station 100 to achieve the individual
control of recorded TV programs.

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Control codes consist of many parts, or categories. Typical categories are
listed in table 1.

Table 1 - Code Categories

Code category	Number of Characters
Country where program is broadcast	2
State or province where program is broadcast	2
Date of program broadcast (yr:mnth:date)	8
Time of program broadcast (Hrs:Min:Sec:00)	8
Channel where program is broadcast	3
Program type	6
Program rating	3
Screen control	3
Masking control	4

Each control code will have alphanumeric characters in a particular sequence. The position of characters in this code will identify the purpose of each character. Now let us use a sample alphanumeric string as an example. Note that the colons (:) between each character set is included for illustration purposes only, they do not form part of the actual control codes. The present invention may contain more, or less control code categories than those shown.

An example of a single control code follows, this is intended to identify a recorded moment at a motor cycling race where a fight has broken out in the pit area and is currently being filmed, the resultant control code sequence would be in the form:

nz:wt:1999:09:26:14:25:32:55:017:sp:mr:mc:v3:456:7890

The following is an explanation of each control code category:

nz Country of origin - New Zealand
 wt State or Province - Wellington
 1999 Year - 1999
 5 09 Month of the year - September
 26 26 day of the month
 14 Time of the day on a 24 hour clock, number of hours past midnight
 - 2:00pm
 25 Minutes past the whole hour - 25 past
 10 32 Seconds past the whole minute - 32 seconds
 55 Fractions of a second past the whole second - 55 hundredths of a
 second
 017 Channel number - 17
 sp Type of program, in this instance, sport
 15 mr Type of sport, in this instance, motor racing
 mc Type of motor racing, in this instance, motor cycling
 v3 Program rating, in this instance, fighting in the pit area, violence
 level 3
 456 Screen control, in this instance, no screen control is involved.
 20 Generally when no screen control is indicated this defaults to 000
 7890 Masking Control, in this instance, no masking control is involved.
 Generally when no masking control is indicated this defaults to 0000.

Using the above example the control code program rating will change
 25 when the fighting in the pits either ceases or the camera focussed on
 another subject. With a time accuracy of one hundredths of a second,
 several program ratings can be entered sequentially by incrementing the
 time by of one hundredth of a second. Since nothing else has changed in
 the example shown, apart from the program rating, the remainder of the
 30 control code will remain unchanged, apart from the continually changing
 program recording time.

Including categories for both program type and program rating gives a wide range of control to cater for most circumstances. Some program categories may have only four code characters rather than six.

- 5 At the code production facility each program is recorded in its entirety onto an appropriate storage medium (eg. onto magnetic tape of a conventional VCR) with a time marker signal embedded. This recording may be replayed manually or electronically to generate control codes, assume in this instance that a manual method is to be used for illustration
- 10 purposes. The pre-recorded magnetic tape is mounted in a tape player and the program played. Since each VCR and coding station is dedicated to a particular TV station there is no requirement to code the Country, region, or station, they are automatically generated at the start of each control code. A code operator views the recording and stops the tape at
- 15 identifiable points, such as a change in violence level or a change in program category. The operator produces a control code at each identifiable point, entering recorded time of the event and the nature of the event, be it a violence rating indicator, say V3, or a program category change, say SP:MR:MC to indicate a motor cycle event. At a commercial
- 20 break the time of the start of the commercial break will be identified, along with the nature of the advertising. The resulting control code will be interpreted by each local station 100 to achieve a desired viewing profile using the stored personal preferences.
- 25 Figure 2 shows the major components of the local station equipment 100. As will be described hereinafter in detail, an incoming program signal, containing audio and video program data is locally stored on a hard disk 140 or other storage medium along with an accurate program time marker signal from a built-in time clock 135. Supply of control codes to
- 30 the local station equipment 100 is undertaken from the remote central processing station 200 using a suitable transmitter, e.g. a modem 130. The control code signal, carrying the control codes and other relevant information can be either scrambled (e.g. encrypted) or not scrambled (no

encryption), and can be an analogue signal, such as in the NTSC, PAL, or SECAM format, or a digital signal. The incoming coded control signal may pass through an encryption module 136 before processing within a controller 120.

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Consider Figure 2 in more detail. The local station 100 includes a tuner 110 and/or program selector 115 for receiving the incoming program signal or signals from cable, satellite dish or arial/receiver, or other means.

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A demodulator 105 and/or decoder 108 demodulate and decode the received program signal. The demodulator and decoder may also be used to demodulate and decode the received control codes also. The main controller 120 processes all received control codes, assembles recorded program data that will determine which control codes are to be transmitted when connected with remote station 200. It also controls all

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local station operations, (the controller unit 120 amongst other features, allows an authorised user to control which programs are received and recorded as well as control access to the received program by use of access codes). The memory/storage 140 stores recorded program data, transmitted control codes, recording and playback caches, a program

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addressable section and general EPG information that consists of program titles, operational software and general ratings and categories for establishing future program recordings, data and updates. See later description for typical uses of memory 140. A player 150 feeds through a modulator 155 to one or more TV sets 156 and/or 157, (player 150, recorder 160 and memory/storage 140 may be contained within a single module). A remote control unit 195 controls access to the recorded programs via the menu on TV 156, and remotely controls local station functions. A time clock 135 is used to supply time markers to incoming recorded programs. A removable recording medium 180 is provided.

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This can be any form of magnetic, optical, or other forms of storage and is used when programs are transferred from one local station to another or are stored for future viewing. An encryption/de-encryption facility 136

converts encrypted code. A conventional VCR 170 can be connected to transfer recorded programs to magnetic tape.

Figure 3 shows the main components of remote station 200. As shown, a typical remote station includes a server 210 and transmitter 220 to connect with local stations 100. A remote control 230 provides overall control of remote station 200. Code storage 240, stores all remote station generated control codes as well as EPG information 270 that will be transferred to local station 100 for updating future TV program guide. All time functions of remote station rely on time check 325.

As shown in Figure 4, the remote code production facility 300 receives an incoming TV signal from tuner 310. A signal/time combiner 320 combines a continuous accurate time marker signal, from time check 325 with incoming TV signal. The resultant signal/time combination is stored on video storage devices 330. One video storage device 330 is required for each recorded TV channel or station. VCR output 340 will later playback the stored signal/time combination. The embedded time display, achieved by signal/time combiner 320 is displayed on VCR viewer output 340. Each event during playback is identified manually or automatically by event recognition 345. This event identification produces an automatic or manual (when keyboard 350 is used) control code 355 sequence that is stored in code storage 360. The content of this control code includes control code time markers which indicate the recorded time a particular program event begins and ends as well as other parameters as already described. A remote station code storage unit 360 stores the generated control codes from individual stations. This may be housed within server unit 210. A combined central storage 370 is provided for generated control codes from all channels or stations. A code control facility 380 handles all code transfers in and out of memory. A time check 325 aligns both remote station 200 and local station 100 timing requirements. A user validation system 400 checks user and local station information against fraudulent control code requests.

Figure 5 shows the user validation system 400, this connects with the remote code production facility 300, checking and validating the incoming code requests. The incoming request is firstly checked by the processor identity check unit 410 (PICU) to locate and validate a unique processor identifier code contained in local station 100 using data stored in central records 435. If the processor identifier code is valid the request progresses through to the user validation unit 420 (UVU). If the PICU request is invalid a return message is generated back to the local station 100 for local display 156, identifying why the request was rejected. In the UVU the user and password are validated from data stored in central records and compared with the registered processor identifier code from processor identity unit 410. If this combination is valid the request progresses through to the user account check unit 430 (UACU) where user reference is used to verify the specific account is current. If the UVU request is invalid a return message is generated back to the local station 100 for local display 156, identifying why the request was rejected. If UACU request is valid it progresses through to the system checker unit 440 (SCU) where the past control code transfer characteristics of the unique user are monitored for valid transfer criteria and to determine if a local station maintenance check 500 is required. If the UACU request is invalid a return message is generated back to the local station 100 for local display 156, identifying why the request was rejected. All information transferred in and out of local station 100 is transmitted by remote station transmitter 405 or local station transmitter 130 using network 140 or some other means of transfer. If a machine maintenance check is due this is undertaken before proceeding further, if no machine check is due the incoming signal request is passed through to the remote code production facility 300 for processing, see Figure 4.

The remote code production facility 300 interrogates the recorded program memory 140 of each local station 100 to determine which programs require control codes. Control codes are obtained from the

combined code storage 370 and transmitted to the local station 100 for storage in program code memory 140 via modem 405 and network 140.

Figure 6 shows the machine check system 500. When a control code request is received from user validation system 400, system checker 440 uses central records 435 to validate that machine check is both valid and due. The local station equipment 100 is checked for maintenance software version, if this is not current an update is transmitted and installed. After validating installed maintenance software version, software is activated by an instruction from machine check system 510. Upon completion of a maintenance check the local station equipment 100 identifies check results to central records 435. If no corrective action is required the check report is filed for the periodic system report in central records 435, or in check systems reports 530. If corrective action is required, the machine check control 510 may, dependent upon the results, either run additional software or instigate a technician report form, where a technician will be advised of the problem, generate a copy of the results and also issue a machine visit report, this will be sent to user and technical support group for a follow up.

Figure 7 shows a typical, major item flow diagram when program data is recorded by memory 140. The desired signal is received from tuner 110 and passes through the demodulator 105 and decoder 108. The controller 120 determines if adequate resources are available to record the desired program by determining what programs are currently being recorded 160 or played 150 or 180. If adequate resources are available the recorder is activated and the time signal from unit timer 135 is continuously embedded along with the recorded program data into memory 140.

Playing a program from screen menu

Figures 8A and 8B show a basic step sequence to play a program selected from the screen menu. It is assumed that control codes for the selected program are already resident in memory 140.

- 5 A1. Turn on TV set if not already on.
- A2. Press "Menu" button on the remote control to bring up system
 screen menu on TV screen.
- A3. User ID is requested (if restricted access function has not been
10 enabled then the system jumps to A7)
- A4. User enters their individual ID
- A5. If entered ID is valid then the user password is requested
15
- A6. User enters their individual password
- A7. If entered password is valid the level 1 screen menu appears
- 20 A8. User selects "Play" from level 1 screen menu
- A9. Screen menu level 2 for "Play" appears
- A10. User selects the recorded program from displayed list and screen
25 menu closes.
- A.11 Selected program request is processed by Controller 110
- A12. Request is made for EPG information.
- 30 A13. EPG information and User ID (if required) is retrieved from Program
 Addressable Memory

A14. Control codes are retrieved from memory

A15. Control codes are aligned with program information

A16. Viewing of selected program occurs with application of personal preferences determined by user ID.

The control codes retrieved in step A14 each include a control code time marker, giving a precise date and time (with an accuracy of 1/100 of a second). In step A16 the comparator 185 compares the program ratings contained in each control code with the set of stored personal preferences, and compiles a list of control codes associated with desired program segments. For example if a control code gives a violence rating above a maximum violence rating, then that control code is skipped. If the violence rating of a control code is below the maximum violence rating, then the control code is entered onto the list. A similar comparison is made for all other personal preferences, eg. sexual content, advertising content etc.

The previously recorded program data is stored with embedded program time markers marking each 1/100 second segment of program data. Once the list of control codes has been fully compiled and stored, the controller can then compile an edited program by selecting program segments with program time markers equivalent to the control code time markers in the compiled list. The edited program can be stored on removable recording medium 180 for later viewing, or can be viewed immediately on TV 156 without any intermediate storage.

Transferring Control Codes to Local Station Memory

Figure 9 shows a sequence where the control code is transmitted to local station (individual machine) memory.

- B1. Timer contacts controller 120 to issue an instruction initiating a scheduled connection with remote station to transfer control codes.
- 5 B2. Local station controller 120 issues a connect instruction to modem
- B3. Modem initiates a connection with remote station. If no phone line connection is possible another call attempt to remote station is rescheduled for a set time (approximate 5 minutes delay) later. At
10 this time televisions with the capability for automatic operation are turned on and a screen message shows that connection with remote station is not possible. A number of options for customer to check are also listed. This sequence is repeated for a set number of times before rescheduled delay time is increased (approximate 15
15 minutes intervals). This sequence continues until a connection to remote station is made.
- B4. When initial connection is made the call is processed through a user validation sequence before call is logged on to remote station.
20
- B5. Call is logged onto remote station
- B6. Code control station requests menu information from local station program memory
- 25 B7. Local station retrieves menu information from local station memory and transmits to code control station.
- B8. Transferred menu information is read by code control station. The transferred menu information indicates which programs have been
30 recorded by the local station and also indicates recorded programs for which the local station has not yet received control codes.
- B9. Desired control codes are assembled at the remote control station.

- 5 B10. Desired control codes are retrieved from remote station combined code storage memory
- B11. Control code is transferred to local station.
- B12. Local station memory is updated with new control codes.
- 10 B13. Control code transfer completed
- B14. Connection between local station and remote station is terminated.
- B15. Program information transmitted to remote station is deleted from program memory section to allow new program data to be added as programs are recorded.
- 15 B16. Future selections and local station menu are updated using new future program listings and new control codes..
- 20 B17. If system is not recording it powers down to standby mode.

Manually recording a program into local station memory

25 Figure 10 shows the sequence required for manually recording a program into local station memory 140.

- C1. Pressing the record button to manually record a program.
- 30 C2. If restricted viewing option is enabled user ID and passwords are requested
- C3. Local station software starts the recording sequence.

- 5
- C4. Sequence goes through a recorder initial check subroutine, this checks current use of recorder.
- C5. EPG information is retrieved from program data memory. This will use current time and selected channel to establish which program is to be recorded.
- 10
- C6. EPG information is converted to a program storage capacity for the intended program. This uses program length at the default recording quality for that category of program.
- 15
- C7. Available space on main program memory is checked by a disk space subroutine to establish remaining space on main program memory, or allocated space for individual viewers and compared with anticipated space for intended program.
- 20
- C8. Older programs deleted from memory.
- C9. EPG information for deleted programs purged from program menu memory.
- 25
- C10. Timer marks start time for program to be recorded
- C11. Local station controller issues a start recording instruction
- 30
- C12. Selected program recording starts
- C13. If pause is pressed during program recording a pause subroutine is activated and the image on the screen is frozen and will remain frozen for a specified time or until the pause button is again pressed.

- 5 C14. Information can be held in a write through cache buffer, up to a specified time limit. This is used if delayed viewing during live viewing occurs. The program can be restarted where pause button was pressed and afterwards can be played at normal speed or fast forwarded as the user desires.
- C15. Using retrieved program data the end of the manually recorded program will be identified by the timer.
- 10 C16. At the specified program end time recording is stopped automatically by the local station controller or manually at any time by the user. If stopped before normal finish time the program menu is updated with the actual finish time.
- 15 C17. Program recording stops.
- C18. If part of the program remains in the write through cache this remains to be played back. When all program material in write through cache is extinguished it is flushed clear so it is ready for use again.
- 20 C19. Program addressable memory is updated with channel number and stop/start times of manually recorded program so the next connection with remote location will transfer codes for this program, and for any others recorded manually or preferentially between one code transfer and the next.
- 25 C20. Once all information has been written to the PAM and no other local station actions are underway the local station powers down to a standby mode awaiting the next operation.
- 30 C21. Program recording completed.

Recorded segment composition

Figure 11 shows the composition of programs in both the as recorded (Figure 11A) and as played back, with undesired segments removed (Figure 11B).

Figure 11A shows a graphic representation of a small time slice of recorded material. This material contains of desired segments (1, 3 and 5) in between undesired segments (2 and 4). Both desired (1, 3 and 5) and undesired segments (2 and 4) can be of various lengths and are determined by a combination of the recorded program time marker, to establish position, and the control codes, to establish content, that are transmitted from the remote location some time after the program has been recorded on the local station. When the local station records the program, it is recorded in its entirety with no segments removed, unless the user changes the operation of the machine during the recording process, or the machine experiences a power failure. If the machine recording is paused during a recording session the time marker still tracks the recording progress, even with pause activated during recording the application of personal preferences will not be affected, but will now only be applied to the actual recording segments rather than the total program length.

As can be seen in figure 11B, the skipped segments 2,4 are completely removed in the edited program sequence, giving a seamless transition between the previously non-adjacent segments 1,3,5.

Time marker Application

The continuous program time marker identifies the exact time a particular action, or circumstance, occurs on the recorded program. An illustration follows of an assumed portion of a film that has been recorded:

At 10:00:00pm exactly the program introduction starts; at 10:03:25pm the film begins with a panoramic camera sweep of a frozen wilderness area; at 10:05:40pm the camera zooms into an adult white bear loping through the snow. The camera follows the bear until 10:07:17pm when the subject changes to a hunter training his rifle on the bear. The camera switches between the bear and the hunter until at 10:10:36pm when the hunter is shown squeezing the trigger and at 10:10:42pm the shot rings out and at 10:10:44pm the bear is shown to be hit and at 10:10:47pm the bear is shown falling lifeless, at 10:10:50pm the hunter is shown walking towards the motionless bear.

Let us now assume the user in question has a maximum violence rating below that applied to scene where an animal is shown receiving a lethal bullet and dying. The coding for the sequence would be, for the sake of this illustration, not be rated in a violence category until the hunter trained his rifle on the bear, at that instance the assumed violence rating of three would be applied, at the instant the hunter shot the bear the violence rating is assumed to increase to five and remains at five until the bear has fallen down assumed dead. The rating for a dead bear now drops to an assumed level of three and remains on three until the hunter is shown walking towards the bear where the violence level is now unrated.

What does this mean to the user with a set violence level of four? When the recorded film is viewed, as illustrated in Figure 11B, the only skipped segment will be segment where the violence level exceeds the set violence level. It will not show the bear hit by the bullet and falling over. This segment of the original program will be designated as undesired by the application of the violence preference level.

Using the same section of assumed film and now applying a different set of personal preferences would produce a different playback sequence. In this instance assume the user has set his violence level as uncontrolled so that all violence levels are viewed but has included a program introduction

removal instruction. Now when the user views the film it will start at a recorded time of 10:03:25pm at the beginning of the actual film with the introduction period from 10:00:00pm to 10:03:25pm skipped. This user will see the bear shot and fall as well as all the other scenes before and after.

Note that the above example times are quoted to the nearest second; the present invention may code events and circumstances to a fraction of a second. The above also illustrates one parameter, violence. Many other parameters may be included covering such categories as sex, nudity, offensive language, adult issues, etc. All can be categorised into levels of acceptability by the application of a parameter identifier and a rating, such as those identified above where user 1 imposed a violence level as 4, this would be identified as V4. See Control Code makeup for additional details.

Program Recording Quality Level

Figure 12 shows diagrammatically a system where a chosen type of program for recording is allocated a default quality of recording, by applying the programs attributes, changeable by user at any time. Each category of program will have an assigned recording quality level, unless changed by user.

Each recording level is suitable for a variety of programs depending on the amount of detail and movement they contain. To retain viewing pleasure each user will be required to trial different recording quality levels for the most common programs they wish to watch.

Recording Quality Level	Type of programs recorded
Low	Little or no movement or low screen detail – stick type cartoons, face to face interviews, etc.

Medium	Low to moderate movement and/or detail – soap operas, news,
Good	Moderate movement and/or detail – most sports and movies, some nature programs, etc.
High	Rapid movements and/or detail – motor racing, high action movies

Memory Types

It will be clear the majority of available memory is allocated to storing programs. The recording cache is larger than the playback cache to allow for pausing a live program for a period and then watching the program from the point where it was paused some time later. Types and usage of memory 140 are detailed in table 2 below

TABLE 2

TYPE OF MEMORY	VOLATILE OR NON-VOLATILE	USAGE
Program Addressable APM	Non Volatile	Recorded programs details, start and stop times and channel involved
Program	Non Volatile	Storing recorded programs
Control Codes	Non Volatile	Transmitted Control Codes for controlling personal preferences, segments to be watched or skipped, etc.
Software	Non Volatile	Software for equipment operations
Program Data	Non Volatile	Transmitted program information covering schedules of future programs, general program ratings, start and stop times, program reviews, main characters, actors, etc. Used to establish a

TYPE OF MEMORY	VOLATILE OR NON-VOLATILE	USAGE
		listing of programs to be recorded using personal preferences.
Playback Cache	Volatile	Buffering multiple concurrent playback sessions
Recording Cache	Volatile	Buffering multiple concurrent conflicting recording sessions and for delayed playback whilst pausing during viewing of "live" TV.

Where in the foregoing description reference has been made to integers or components having known equivalents then such equivalents are herein incorporated as if individually set forth.

Although this invention has been described by way of example it is to be appreciated that improvements and/or modifications may be made thereto without departing from the scope or spirit of the present invention.

WHAT IS CLAIMED IS:

1. A method of editing a program, the program comprising a plurality of adjacent program segments which run in a program sequence and a plurality of program time markers each associated with a respective program segment, the program including at least one undesired program segment interleaved between a pair of non-adjacent desired program segments, the method comprising:
- generating a plurality of control codes, each control code being indicative of program content contained in a respective program segment;
- generating a control code time marker for each control code;
- identifying the undesired program segment(s) by comparing the control codes with previously stored personal preference data to identify an undesired control code, and locating a program segment having a program time marker corresponding with the control code time marker of the undesired control code; and
- generating an edited program sequence by skipping the identified undesired program segment(s) and arranging the pair of desired program segments such that they lie adjacently in the edited program sequence.
2. A method according to claim 1 further comprising storing the desired and undesired program segment(s), and compiling the edited program sequence from the stored program segment(s).
3. A method according to claim 2 further comprising:
- generating and storing the program time markers.
4. A method according to any one of the preceding claims wherein the control codes are generated at a remote control code facility and the edited program sequence is generated at a local station, the method

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further comprising transmitting the control codes from the control code facility to the local station.

5 5. A method according to claim 4 wherein the program is broadcast on a mass broadcast medium and received substantially simultaneously from the mass broadcast medium by the remote control code facility and the local station.

10 6. A method according to claim 4 further comprising transmitting the program from the remote control code facility to the editing station.

15 7. A method according to any one of the preceding claims further comprising storing an edited program comprising a plurality of program segments which run in the edited program sequence.

8. A method according to any one of the preceding claims further comprising displaying an edited program comprising a plurality of program segments which run in the edited program sequence.

20 9. A method according to any one of the preceding claims further comprising storing edited program sequence data which is indicative of the desired program segments which make up the edited program sequence.

25 10. A method according to claim 9 and claim 3 wherein the edited program sequence data comprises a list of program time markers.

30 11. Apparatus for editing a program, the program comprising a plurality of adjacent program segments which run in a program sequence and a plurality of program time markers each associated with a respective program segment, the program including at least one undesired program segment interleaved between a pair of non-adjacent desired program segments, the method comprising:

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means for generating a plurality of control codes, each control code being indicative of program content contained in a respective program segment;

5 means for generating a control code time marker for each control code;

means for identifying the undesired program segment(s) by comparing the control codes with previously stored personal preference data to identify an undesired control code, and locating a program segment having a program time marker corresponding with the control code time marker of the undesired control code; and

10 means for generating an edited program sequence by skipping the identified undesired program segment(s) and arranging the pair of desired program segments such that they lie adjacently in the edited program sequence.

12. Apparatus according to claim 11 further comprising a memory for storing the desired and undesired program segments, and means for compiling the edited program sequence from the stored program segments.

13. Apparatus according to claim 12 further comprising:
means for generating and storing the program time markers.

14. Apparatus according to any one of the claims 11 to 13 wherein the control codes are generated at a remote control code facility and the edited program sequence is generated at a local station, the apparatus further comprising means for transmitting the control codes from the control code facility to the local station.

15. Apparatus according to claim 14 wherein the remote code control facility and the local station each further comprise means for receiving the program from a mass broadcast medium.

5 16. Apparatus according to claim 14 further comprising means for transmitting the program from the remote control code facility to the editing station.

10 17. Apparatus according to any one of claims 11 to 16 further comprising a memory for storing an edited program comprising a plurality of program segments which run in the edited program sequence.

15 18. Apparatus according to any one of claims 11 to 17 further comprising a display for displaying an edited program comprising a plurality of program segments which run in the edited program sequence.

20 19. Apparatus according to any one of claims 11 to 18 further comprising a memory for storing edited program sequence data which is indicative of the desired program segments which make up the edited program sequence.

20. Apparatus according to claim 19 wherein the edited program sequence data comprises a list of program time markers.

COMBINED DECLARATION AND POWER OF ATTORNEY

As below named inventor, I hereby declare that

This declaration is of the following type:

- ☐ original ☐ design ☐ supplemental
☒ national stage of PCT
☐ divisional ☐ continuation ☐ continuation-in-part

My residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first, and sole inventor (*if only one name is listed below*) or an original, first, and joint inventor (*if plural names are listed below*) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Method and Apparatus for Editing a Program

the specification of which:

- ☐ is attached hereto.
☐ was filed on _____ as Serial No. _____ and was amended on _____ (*if applicable*).
☐ was filed by Express Mail No. _____ as Serial No. not known yet, and was amended on _____ (*if applicable*).
☒ was filed on September 16, 1999 as PCT International Application No. PCT/NZ99/00156 and was amended under PCT Article 19 on _____ (*if any*).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

COUNTRY	APPLICATION	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119		
New Zealand	331908	16 Sept. 1998	X	YES	NO
				YES	NO
				YES	NO

I hereby claim the benefit pursuant to Title 35, United States Code, § 119(e) of the following United States provisional application(s):

PRIOR U.S. PROVISIONAL APPLICATIONS CLAIMING THE BENEFIT UNDER 35 USC 119(e)	
APPLICATION NO.	DATE OF FILING

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 USC 120					
U.S. APPLICATIONS			Status (check one)		
U.S. APPLICATIONS	U.S. FILING DATE	PATENTED	PENDING	ABANDONED	
1. 0 /					
2. 0 /					
3. 0 /					
PCT APPLICATIONS DESIGNATING THE U.S.			Status (check one)		
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NOS. ASSIGNED (if any)	PATENTED	PENDING	ABANDONED
4.					
5.					
6.					

DETAILS OF FOREIGN APPLICATIONS FROM WHICH PRIORITY CLAIMED UNDER 35 USC 119 FOR ABOVE LISTED U.S./PCT APPLICATIONS				
ABOVE APPLN. NO.	COUNTRY	APPLICATION NO.	DATE OF FILING (day, month, yr)	DATE OF ISSUE (day, month, yr)
1.				
2.				
3.				
4.				
5.				
6.				

As a named inventor, I hereby appoint the following attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I further direct that correspondence concerning this application be directed to DICKINSON WRIGHT PLLC, 1901 L St., NW, Suite 800, Washington, D.C. 20036-3506, Telephone (202) 457-0160.

I hereby declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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